Glossary

1. Abbreviations and Acronyms

1DRMS:	One deviation (sigma) Root Mean Square
2DRMS:	Two deviations (sigma) Root Mean Square
2-D:	Two dimensional
3-D:	Three dimensional
A-E:	Architect-Engineer
AEA:	Average end area
AD:	After-dredging survey
BD:	Before-dredging survey
BM:	Benchmark
bps:	Bits per second
CADD:	Computer Aided Design and Drafting
CERC:	Coastal Engineering Research Center (Coastal & Hydraulics Laboratory)
CHS:	Canadian Hydrographic Service
CONUS:	Continental United States
COR:	Contracting Officer's Representative
CPE:	Circular probable error
CRREL:	Cold Regions Research and Engineering Laboratory
CSE:	Circular standard error
CW:	Civil Works
cf:	Cubic foot
cy:	Cubic yard
dB:	Decibel
deg:	Degrees
DEM:	Digital elevation model
DTM:	Digital terrain model
DFARS:	Defense Federal Acquisition Regulation Supplement
Diam:	Diameter
DOP:	Dilution of precision
DTM:	Digital terrain model
DGPS:	Differential global positioning system
EDM:	Electronic distance measurement
EFARS:	Engineer Federal Acquisition Regulation Supplement
EM:	Engineer Manual
EP:	Engineer Pamphlet
EPS:	Electronic positioning system
ERDC:	Engineer Research and Development Center
ETS:	Electronic tracking system
ER:	Engineer Regulation
FAR:	Federal Acquisition Regulation
FGDC:	Federal Geographic Data Committee
FOA:	Field Operating Activity
fps:	Feet per second
ft:	Feet
FTE:	Full-time equivalent
GDOP:	Geometric dilution of precision
GIS:	Geographic information system
GPS:	Global positioning system
GRS 80:	Geodetic Reference System of 1980

HDOP:	Horizontal dilution of precision
HEC:	Hydrologic Engineering Center
HEC-RAS:	HEC-River Analysis System
HPR:	Heave pitch roll
HTRW:	Hazardous toxic & radioactive waste
HQUSACE:	Headquarters US Army Corps of Engineers
Hz:	Hertz
IGLD:	International Great Lakes Datum
IHO:	International Hydrographic Organization
JALBTCX:	Joint Airborne LIDAR Bathymetry Technical Center of Expertise
kHz:	Kilohertz
kts:	Knots
lb	Pound
LIDAR:	Light detection and ranging
LWRP:	Low water reference plane
m:	Meter
MCY:	Million cubic yards
mi:	Mile
MLLW:	Mean lower low water
MLW:	Mean low water
MSE:	Mean square error
MSL:	Mean sea level
MTL:	Mean tide level
NAD 27:	North American Datum of 1927
NAD 83:	North American Datum of 1983
NAVAID:	Navigational aid
NAVCEN:	Navigation Center (US Coast Guard)
NAVD 88:	North American Vertical Datum of 1988
NAVOCEANO:	US Navy Oceanographic Office
NGRS:	National Geodetic Reference System
NGS:	National Geodetic Survey
NGVD 29:	National Geodetic Vertical Datum of 1929
NIMA:	National Imagery and Mapping Agency
nm:	Nanometer
NOAA:	National Oceanic and Atmospheric Administration
NOS:	National Ocean Survey
NSRS:	National Spatial Reference System
NTE:	Not to exceed
O&M:	Operations & Maintenance
OTF:	On-The-Fly GPS (real time kinematic carrier)
P&S:	Plans & Specifications
PI:	Point of intersection
ppm:	Parts per million
PPS:	Precise positioning service
ppt:	Parts per thousand
PRIP:	Plant Replacement and Improvement Program
QA:	Quality assurance
QC:	Quality control
RMS:	Root mean square
RMSE:	Root mean square error
RPM:	Rounds per minute
RTK:	Real time kinematic
SA:	Selective availability
SAR:	Synthetic aperture radar

SDS:	Spatial Data Standard
sf:	Square feet
SHOALS:	Scanning Hydrographic Operational Airborne LIDAR Survey
SPCS:	State plane coordinate system
SPS:	Standard positioning service
sq ft:	Square foot
sqrt:	Square root
STA:	Station
TBM:	Temporary benchmark
TEC:	Topographic Engineering Center
TIN:	Triangulated irregular network
U/M:	Unit of measure
U/P:	Unit price
UNB:	University of New Brunswick
URL:	Universal Resource Locator
US (U.S.):	United States
USACE:	US Army Corps of Engineers
USATEC:	US Army Topographic Engineering Center (ERDC)
USC&GS:	US Coast & Geodetic Survey
USCG:	US Coast Guard
USGS:	US Geological Survey
UTM:	Universal Transverse Mercator
VDC:	Volts Direct Current
VDOP:	Vertical dilution of precision
WES:	Waterways Experiment Station
WGS 84:	World Geodetic System of 1984
WRDA:	Water Resources Development Act

2. Glossary of Terms

Acceptance Section: A portion of an overall dredging contract over which payment is computed, based on estimated progress per payment period. A contract may have any number of acceptance sections.

Acceptance Survey: see Contract Acceptance Survey.

Accuracy: The degree of closeness of a variable to its true value.

Advance Maintenance Dredging: The additional depth and/or width specified to be dredged beyond the project channel dimensions for the purpose of reducing overall maintenance costs by decreasing the frequency of dredging. Advance maintenance must always be authorized.

After-Dredging Survey: Hydrographic survey(s) performed after dredging of a required section(s) has been completed. This survey is used for clearance, payment, and acceptance purposes.

After-Construction Survey: Any survey performed upon completion of construction, usually for payment or quality control purposes.

Allowable Overdepth: See *Overdepth*.

Analog Depth Recorder: A graphical recording echo sounder showing profile view of channel section..

Archeological Survey: Survey conducted to locate and/or investigate surface/subsurface archeological ruins. Typically, magnetometers and side-scan sonars are used for offshore archeological investigations.

Architect-Engineer (A-E) Contract: The type of contract prescribed for procuring hydrographic surveys in accordance with FAR Part 36.

Authorized Dimensions (Project): Length, width, and depth dimensions of a navigation channel as specified in the congressional authorizing document for the navigation project.

Automated Hydrographic Survey Processing System: A computer system which combines positional and depth measurements into a single database, including associated guidance, tracking, editing, plotting, and quantity take-offs.

Bar Check (Calibration): Method by which echo sounders are independently calibrated with a doubly suspended reference bar.

Baseline: The primary reference line defining a construction coordinate system.

Baseline Boat: An anchored boat used to extend an offshore baseline for tag line surveys.

Bathymetry (bathymetric): The measurement of ocean depths to determine sea floor topography.

Beach Renourishment Surveys: Surveys of coastal erosion control projects that involve combined topographic and hydrographic surveying procedures.

Before-Dredging Survey: Survey performed immediately in advance of a dredging operation for initial payment reference grade.

Bend: A channel turn that is designed as a continuous curve with a given radius; usually provided for large channel changes (or turn angles) in direction.

Bendway: Channels in curved reaches, extending along one bank, usually with usually with limited width restrictions and increased flows.

Bid Documents: Contract plan and specification documents from which bids were estimated and tendered.

Bin Measurement: A method of estimating work accomplished where the measurement of material in a hopper or scow is used for payment purposes.

Box Cut: Dredging a slope steeper than the required slope, including partial payment allowance therefor. Material removed from the box cut is payable up to that amount of material above the side slope line.

Brackish: Moderately saline water.

Bulkhead: A protective structure used to maintain stable shorelines in ports and waterways.

Canal: An excavated shallow- or deep-draft watercourse designed for navigation, usually artificially cut through land area to bypass rock outcrops and rapids, or through shallow intracoastal areas where an adequate depth cannot be maintained at low water periods. When connected to an existing stream or other body of water, locks may be required to offset steep gradients causing velocities too high for navigation. Canal edges or borders usually extend above the water surface with visible banks and important ship and bank interaction effects. The East and Gulf Coast intracoastal waterway systems are considered canals under this definition.

Center-line Survey: Surveying only the center line of a project alignment, or profile survey.

Chainage: see Stationing and Station-Offset.

Channel (Bar): Type of entrance channel, usually passing over a shallow offshore bar.

Channel (Cutoff): Channels cut through a bendway; constructed to eliminate sharp bends, eliminate troublesome reaches, reduce the length of a navigation channel, or increase the flood-carrying capacity of the stream.

Channel (Deep-Draft): Type of navigation channel providing for the movement of vessels with drafts of 15 feet or more, and designed for open-water navigation including seagoing and intracoastal vessels and vessels operating in the Great Lakes. Deep-draft channels are usually marked and designated on the appropriate navigation charts with known/fixed depth and width parameters. May be formed and maintained totally, or in part, through excavation, such as dredging.

Channel (Divided): Bifurcated channels or divided flow found in alluvial inland navigation streams, in addition to those formed by cutoffs.

Channel (Downbound): For waterways with a current, downbound means in the direction of the current. For slack water this characterizes traffic that moves in a southerly or westerly direction.

Channel (Entrance): The main access channel into a bay, harbor, or port.

Channel (Fairway): A navigable pathway in an open and unobstructed waterway, such as a bay, lake, sound, or straight, or open coast, usually leading into a harbor from the open sea; outside a buoyed channel, ordinarily used by vessel traffic, and so designated by appropriate authority.

Channel (Inbound): This characterizes traffic moving from one waterway into another where the destination in on the subject waterway.

Channel (Inland River Navigation System): An inland waterway system typically used by shallow-draft (15 feet or less) commercial towing and recreational vessels. Includes open river navigation systems (Mississippi River below St. Louis, Missouri River, and Columbia River below Bonneville Dam) and canalized streams with locks and dams (e.g., Ohio River, Mississippi River above St. Louis, Arkansas River). Minimum width of inland waterway channels is dependent on the type and size of vessels, alignment, current velocities, traffic patterns and clearances, and many other factors.

Channel (Interior): Connects the entrance (inlet) channel to port facilities. Usually semiprotected in a bay, estuary, or river.

Channel (Meandering): Natural inland streams having erodible bed and banks; developing a sinuous course consisting of a series of alternate bends and crossings with some relatively straight reaches.

Channel (Navigation): A project feature with authorized project limits/dimensions, which is designed, constructed, and maintained for use by commercial and/or recreational navigation traffic. Includes appropriate harbors, canals, turning basins, anchorage/mooring areas, and/or waterways.

Channel (Outbound): Characterizes traffic moving from one waterway into another where the origin in on the subject waterway.

Channel (Privately Maintained): Non-Federal channels and berthing areas maintained by states, regional authorities, local governments, or private interests.

Channel (Shallow Draft): Type of navigation channel providing for the movement of small commercial and recreational vessels with drafts less than 15 feet. Shallow-draft channels are usually marked and designated on the appropriate navigation charts with known/fixed depth and width parameters. May be formed and maintained totally, or in part, through excavation, such as dredging.

Channel (Side): Channels adjacent to the navigable channel created by divided flows in and around islands or other obstructions.

Channel (Spur): Similar to terminal or interior channels.

Channel (Straight): Channels in long straight reaches or in long flat bends in inland navigation systems. Straight reach banks are often unstable and tend to be difficult to maintain in sediment carrying streams.

Channel (Terminal): Interior channel leading from main ship channel to a commodity or fuel terminal.

Channel (Upbound): For waterways with a current, upbound means against the current. For slack water, this characterizes traffic that moves in a northerly or easterly direction.

Channel Condition Survey/Report: Tabular or graphical report of channel conditions (e.g., minimum clearances) based on most recent hydrographic survey.

Channel Depth: Depth of a navigation project as defined or refined below:

Authorized depth (Authorized project depth): Depth of a waterway authorized in the enabling legislation for a river and harbor navigation project. Authorized depth is generally the actual dredging limit and not the draft limit of vessels to be accommodated. Channel depth based on draft of loaded design vessel, plus squat, sinkage in fresh water, effect of trim and wave action, safety and efficiency clearances.

Design depth: Channel depth based on draft of loaded design vessel, plus squat, sinkage in fresh water, effect of trim and wave action, safety and efficiency clearances, advance maintenance, and dredging tolerances. Termed "required depth" in dredging projects.

Allowable overdepth (dredging tolerance): Additional depth below the required depth specified in a dredging contract; a dredging pay item (typically 1 to 3 feet below the required depth) to account for inability to dredge at a uniform depth with a fluctuating water surface.

Controlling depth: Actual effective depth based on current hydrographic surveys (i.e., Channel Condition Surveys/Reports) of a navigation project. Due to shoaling and maintenance dredging schedules, controlling depths may be less than the authorized project depth.

Advance maintenance depth: Depth to which a channel is dredged deeper than the authorized depth to provide for the accumulation and storage of sediment.

Nominal project depth: The depth which must be maintained in order to ensure the safe passage of any vessel operating within the authorized project dimensions at mean low tide (typically mean lower low water).

Safety clearance: Designed clearance between bottom of vessel in motion and channel bottom; to avoid damage to ship's propellers from sunken timbers and debris, reduce displacement of bottom material, and avoid fouling pump and condensers by bottom material.

Efficiency clearance: Clearance in addition to that required for safety based on design vessel efficiency, resistance, etc.

Channel Dimensions: Geographic location and physical dimensions of a maintained or natural navigation channel; and as further defined below:

Channel alignment: Fixed design alignment of a channel, or series of channel reaches; based on the centerline of the channel in straight reaches, or on fixed baselines for irregular sections, such as basins, bends, and widener sections. Historical centerline of a river channel which provides safe navigation through a waterway.

Authorized Dimensions: Physical dimensions of a waterway channel authorized in the enabling legislation for a river and harbor navigation project

Channel width: Maintained width of a channel measured at the bottom of the slope at the design depth. Design channel width accumulates width of maneuvering lane(s), clearances between vessels when passing, and bank clearances in restricted channels.

Constructed dimensions: Channel dimensions which have been provided by initial or new work dredging, which may be equal to or less than the authorized project dimensions.

Maintained dimensions: Navigation channel dimensions (length, width, and depth) that are determined by using traffic, or other restrictions, which are less than or equal to the authorized dimensions, or the constructed dimensions if less than the authorized dimensions.

Bank clearance: Horizontal distance between the adjacent maneuvering lane edge and the bottom of the side slope.

Channel ship clearance: Clearance lane or distance between maneuvering lanes to allow for two-way traffic; typically 80% of the beam of the design vessel.

Maneuvering lane(s): Portion of channel width within which a ship may deviate from a mean line while transiting through the channel and maintain safe bank clearances or safe from an approaching vessel.

Points of intersection (PI): Fixed intersection points of two consecutive straight channel reaches, usually designated by Geographic or State Plane Coordinate System (SPCS) grid values and/or station-offset coordinate systems. Channel stationing usually commences at the outermost offshore PI and increases/accumulates shoreward (inbound or upbound) through successive PIs.

Toe limits: The fixed geographic (SPCS) location of the authorized channel limits (or perimeter boundaries of irregular basins), as designated on the project design documents and depicted on navigation charts. Toe perimeters are usually based parallel to and relative to the channel centerline and the authorized width.

Widener section limits: The fixed geographic (SPCS) location of the limits (or perimeters) of widening sections situated at the inside bend of two intersecting channels; as designated on the project design documents and depicted on navigation charts. Stationing may be set relative to the adjacent PI station or by independent baseline formed by intersection of the widener with the main channel toes.

Channel Reach: Linear length or section of navigable channel with defined markings and limits; usually referred to by local name.

Channel Sweep Survey: A full-coverage survey/sweep of an excavated project using rigid bars, side-scan sonar, multiple transducer, or multibeam echo sounding to determine the locations of shoals, obstructions, or hard materials.

Clark Spheroid 1866 (Clark 1866): A rotational ellipsoid having the following dimensions: semi-major axis, 6,378,274 m; semi-minor axis, 6,356,650 m; flattening (derived), 1/294.978. This ellipsoid reference model was used for the NAD 27 horizontal datum adjustment.

Comparison of Simultaneous Observations: A reduction process in which a short series of tide or tidal current observations at any place is compared with simultaneous observations at a control station where tidal constants have previously been determined.

Condition Survey: see Project Condition Survey.

Constructed Dimensions: Channel dimensions which have been provided by initial or new work dredging. These dimensions are equal to or less than the authorized dimensions.

Contract Acceptance Survey: A final survey performed over a construction area or dredging acceptance section to determine quality and/or quantity of construction; typically over a specified portion of a channel to determine if it has been dredged clear to the required grade and can be contractually accepted by the government.

Contract Payment Survey: Any survey intended to measure the amount of contract payment or performance.

Contract Survey: Any survey associated with contracted construction activities.

Control Structure: See flood control structure.

Controlling Depth: Actual minimum depth of a waterway at its shallowest point.

Course Indicator: See *Left-Right (Helmsman's) Track Indicator*.

Cross Section: A survey line run normal to the alignment of a project, channel, or structure.

Crossing: Channel alignment which crosses the waterway from one bank to the adjacent bank; or straight reaches between alternate bends, common on meandering rivers.

Deep-Draft Navigation Project: A project designed and constructed for vessels with drafts exceeding 15 ft.

Deepening Project: Authorized construction for deepening an existing project.

Depth: The distance between a reference surface datum and grade below water.

Depth Digitizer: Electronic device which measures the elapsed times of acoustical pulses and converts these times to depth.

Differential Leveling Surveys: Conventional terrestrial leveling using spirit bubble or self-compensating instruments.

Digital Elevation/Terrain Model: A topographic/geospatial data set of a project area. The DEM is usually a gridded model at constant post spacing. A DTM typically contains terrain breaklines.

Disposal Area Survey: A survey of a dredge disposal area (emergent, submergent, or combined).

Disposal Monitoring. The monitoring of dredges, barges, scows, etc., to and from a disposal area, usually for misplaced dumping purposes.

Disposal Monitoring Surveys: Surveys performed over offshore submergent disposal areas for quality control and environmental purposes, typically to monitor minimum placement grade restrictions, misplaced materials, etc.

Draft (Draft Correction/Variation): Distance from the reference water surface to a point on the hull of a vessel and correction/variation thereof.

Dredge Control and Positioning Systems: Electronic positioning systems used to monitor and control various aspects of the dredging process. These systems primarily include visual analog and digital displays of a dredge's current location/status.

Dredging (Dredging Process): The practice of removing material from underwater locations, including the process of transportation and disposal of material for the purpose of constructing new waterways, maintaining existing waterway dimensions, obtaining fill for land reclamation, beach nourishment, constructing dikes and levees, creating wetlands and marshes, obtaining materials from borrow areas, or other beneficial uses.

During Dredging Survey: A survey performed during dredging operations, usually to monitor daily/weekly/monthly progress and to estimate partial progress payments.

Eccentricity: An offset between measurement reference points.

Electronic Distance Measurement (EDM): Pulsing or phase comparison determination of a distance.

Electronic Positioning System (EPS): A system which receives two or more EDMs to obtain a position.

Emergent Disposal Area: A dredge disposal area constructed in open water with a finish grade above datum.

Epoch: As used in tidal datum determinations, a 19-year metonic cycle over which tidal height observations are meaned to establish a reference datum.

Examination Survey: Another term used in Corps for Project Condition Survey.

Fathometer: Raytheon trade name for an echo sounder.

Feasibility Study Survey. Survey performed in support of feasibility studies in advance of detailed engineering design.

Fix: The instant at which the position of a vessel is observed.

Flat Pool Level. Vertical reference datum used above Lock and Dam 26 on the Upper Mississippi River.

Floating Plant: Dredges, survey boats, barges, tugs, etc. owned by USACE. (From programming category in PRIP).

Flood Control Project: A project involved with the control of flooding due to surface runoff.

Flood Control Structure: A structure used to control or regulate surface water runoff. The structure includes locks, dams, spillways, floodwalls, levees, revetments, dikes, etc.

Fluff: See *Suspended Sediment*.

Geodetic Coordinates: Angular latitudinal and longitudinal coordinates, usually referenced to some defined ellipsoid of revolution (also, geographical coordinates).

Geodetic Reference System (GRS 80): A rotational ellipsoid using parameters of semi-major axis, geopotential number, angular earth rotation rate, and a coefficient from a second-degree Legendre function of the gradational potential. These parameters are also used to compute the WGS 84 ellipsoid.

Geographical Coordinates: See *Geodetic Coordinates.*

Geometric Dilution of Precision (GDOP): A statistic used to measure the geometrical effects on the accuracy of a coordinated point from the intersection of lines, circles, spheres, hyperbolas, etc.

Geotechnical Investigations: Subsurface investigation of soils, rock, and other strata for the purposes of engineering design.

Horizontal Dilution of Precision (HDOP): Horizontal component of GDOP.

Impoundment Basin (Settlement Basin): See *Sediment Basin*.

Indefinite Delivery Contract (IDC): Form of A-E service contract for procuring recurring services, such as hydrographic surveys.

Independent Government Estimate (IGE): The government's estimate used as the basis for comparing and negotiating contracted services.

In-Place Quantity Measurements/Surveys: Process by which the amount of work accomplished (i.e., material excavated or placed) is determined by measuring the in-place conditions, utilizing before- and after-dredge surveys.

Interim (Contract) Survey: A survey performed during construction to monitor progress or placement, often for interim progress payment purposes.

International Great Lakes Datum of 1955 or 1985 (IGLD 55 or 85): Vertical reference datums (and epoch of reference) used in the Great Lakes and their connecting waterways.

Investigation Survey: A survey used for general investigative purposes, usually well in advance of detailed engineering and design.

Kinematic Positioning: A position determined while a vessel is in motion (used synonymously with dynamic positioning).

Left-Right (Helmsman's) Track Indicator: A digital or analog device on a survey boat or dredge which guides the helmsman in steering a prescribed channel alignment or cut area.

Levee: A flood control structure along a waterway, often protected with revetments.

Line of Position: Angular or distance measurement used to determine a position when combined with lines of position from other systems.

Line Spacing: Spacing between successive survey lines of a project area.

Local Project Datum: Any horizontal or vertical construction datum which may or may not be referenced to a regional datum.

Logging (Data logging): Recording of observed survey data.

Longitudinal Surveys (Alignment): Surveys run parallel to a project (channel) alignment--opposite of Cross-Section Surveys.

Low Water Pool. Hydraulically based lower surface reference plane in a controlled/regulated body of water.

Low Water Reference Plane. A hydraulic reference plane based on a particular stage-duration profile (e.g., 1974 Low Water Reference Plane on the Lower Mississippi River).

Lump Sum Construction Dredging Contract: Procurement method by which the contractor is paid a single lump sum price for dredging of material. Mobilization and demobilization are generally a separate bid item.

Maintained Channel Dimensions: Navigation channel dimensions (length, width, and depth), determined by user traffic, which are less than or equal to the authorized dimensions, or the constructed dimensions if less than the authorized dimensions.

Maintenance Dredging: Dredging performed over a constructed project to remove recurring sediment (shoal) buildup.

Maximum Pool Elevation. Maximum pool height in a controlled system.

Mean High Water (MHW): Identical to MLW except using high water heights.

Mean Low Water (MLW): A tidal datum in which the means of the low water heights are observed over a specific 19-year period.

Mean Lower Low Water (MLLW): Tidal datum defined by the mean of the lower low water heights, observed over a specific 19-year period.

Mean Range of Tide: The difference between MHW and MLW.

Mean Sea Level (MSL): A tidal datum which is the mean of hourly water elevations observed over a specific 19-year metonic cycle (the National Tidal Datum Epoch).

Mean Sea Level Datum of 1929: Identical to NGVD 29 (discontinued terminology).

Mean Tide Level (MTL) or Half Tide Level: A tidal datum midway between MHW and MLW.

Measurement and Payment Survey: Surveys performed for contracted construction payment purposes.

Metonic Cycle: A period of 19 years or 235 lunations (1 lunation or synodical month = 29.530588 days).

Minimum crossing distance: Length of straight reach that should be provided between alternate bends in a river channel.

Minimum Pool Elevation. Vertical reference elevation in a controlled surface.

Multibeam System: Channel sweep systems employing a single transducer.

Multiple Ranging: Three or more distances used to trilaterate a position.

Multiple Transducer System: Channel sweep system using multiple vertically mounted transducers.

National Geodetic Vertical Datum of 1929 (NGVD 29): A fixed reference adopted as a standard geodetic datum for heights, based on an adjustment holding 26 primary tide stations in North America fixed. The latest general adjustment is the NGVD 29. Portions of the upper Mississippi River are referenced to the previous (1912) general adjustment. A new readjustment is currently in progress, and will be termed the North American Vertical Datum of 1988 (NAVD 88) when completed. The NGVD is not the same as mean sea level (MSL).

Navigation Aid (NAVAID): An object used for vessel navigation purposes (e.g., buoys, lights, daymarks, beacons, ranges, etc.).

Navigation Channel: A project feature with authorized project limits/dimensions, which is designed, constructed, and maintained for use by commercial and/or recreational navigation traffic. A navigation channel includes harbors, canals, turning basins, anchorage/mooring areas, and/or waterways.

Nominal Project Depth: The depth which must be maintained in order to ensure safe passage at mean low tide.

Navigation Project Dimensions: Depth, width, and lengths of channels, harbor maneuvering areas and anchorages, sidings, bends, turning places, lock sizes, horizontal and vertical bridge clearances and lengths of breakwaters; as authorized in the enabling legislation for a river and harbor navigation project.

Normal Pool Level: Vertical reference datum for canalized river systems.

Offset (Coordinate): Distance parallel to the baseline on a station-offset system.

Offset (Instrument): Distances between sensors, echo sounder, and positioning antennas on a boat.

On-Site Calibration: Calibrating a system at the project site.

Overbank Survey (Sections): Surveys run up river embankments.

Overdepth: Additional depth below the required section (or template) specified in a dredging contract. This additional depth is permitted (but not required) because of inaccuracies in the dredging process.

Pay Grade (Pay Template): The design and/or specified excavation grade to which payment is measured.

Payment Survey: See *Contract Payment Survey*.

Plans and Specifications (Survey): Surveys intended for use in project design, quantity/cost estimating, and contract specifications/plans for bidding purposes.

Pool Elevation. The surface elevation of a controlled body of water.

Prebid Survey: See *Plans and Specifications (Survey)*.

Precision: The amount by which a measurement deviates from its mean.

Preconstruction Survey: Survey performed in advance of construction placement/excavation, usually for monitoring initial in-place condition for subsequent payment reference.

Predredge Survey: Before-dredge survey.

Primary Control Tide Station: A tide station at which continuous observations have been made over a minimum of a 19-year metonic cycle. This station serves as the primary control for transferring control to subordinate tide stations through the method of comparison of simultaneous observations.

Probings: Manual or mechanically/hydraulically assisted investigation of subsurface soils to determine the elevation or existence of rock.

Progress Payment Survey: Survey used to measure the progress of construction at any point for payment purposes (usually performed monthly or in sequence with authorized submittal of construction progress payment estimates).

Project Condition Survey: Survey designed to measure the current condition of a constructed project to determine requirements for maintenance or repair. Performed periodically on authorized navigation projects.

Quality Assurance (QA): Construction procedure by which quality control procedures are monitored. Also, procedures for assessing quality of observed hydrographic depth data.

Quality Control (QC): Construction process by which quality of work and materials is measured and controlled, including surveys performed during that process. Also, procedures and criteria for maintaining adequacy/quality of hydrographic survey equipment.

Quantity Take-Offs: Process of estimating material volume computations--for dredging or other construction.

Range (coordinate): A project offset coordinate, usually relative to the center-line alignment (i.e., sailing range).

Range (distance): An offshore distance measured by an electronic positioning system.

Real-Time Survey/Plot: The processing and/or plotting of survey data during the actual survey.

Reconnaissance Survey: A general minimum-effort survey performed to determine the approximate conditions of a project site.

Remote Station/Transmitter: Term usually identifying hydrographic positioning shore stations.

Required Section/Depth: Excavation section/depth which must be dredged to clear grade.

Revetment: A facing built on an embankment (e.g., levee) to prevent scour by weather or water.

Revetment Surveys: Surveys performed on revetments for condition and/or construction purposes.

Sailing Line: Recommended navigation channel in an inland waterway system. Recommended sailing lines may vary seasonally.

Scale Factor (Grid/Correction): A factor used to correct for differences between grid and geodetic distances.

Sea Level Datum (SLD): This term should not be used due to the confusion over differences between NGVD 29 and mean sea level.

Secondary Control Tide Station: A tide station at which continuous observations have been made over a minimum period of 1 year but less than a 19-year metonic cycle.

Sediment Basin: A basin constructed to trap sediment eroded from a slope or being transported by a river.

Shallow Draft Project: A navigation project with a project depth less than 15 feet.

Shoaling (shoal): The reduction of water depth due to sediment deposition.

Side Slope (Channel). The designed/constructed cut on the side banks of a navigation channel, normally referred to by the gradient ratio.

Sounding: A subsurface depth measured by an acoustic device or echo sounder. This term is generalized to include any depth regardless of how it was measured (lead line, sounding pole, etc.).

Stage: The elevation of a river or confined water area, usually referred to a low water datum plane.

Start/Stop Points: The end points of an arbitrary baseline used to reference surveys performed with an automated hydrographic survey system and from which survey line offsets are run. The baseline is normally aligned to the project stationing.

State Plane Coordinate System (SPCS): A reference coordinate system used by the various states of the United States of America.

Station (Stationing): Measure of distance along a project's alignment, typically in 100-ft increments.

Station-Offset Coordinate System: A construction coordinate system referenced to a local baseline which is usually aligned with the center line of the project.

Stilling Well: Mechanism or structure for stilling wave action in a tide or water level stage gage.

Strike: Object or shoal lying above grade in a channel.

Submergent Disposal Area: A dredge disposal area where the top of grade is below the water surface by some specified amount (offshore disposal area).

Subsurface Elevation: An absolute elevation of a point below water, usually referenced to an established vertical datum--as opposed to reference to a water level plane/datum.

Subsurface Investigations: Engineering investigations of subsurface materials or structures.

Survey Alignment: The direction of survey lines relative to the project alignment (e.g., cross sections, profiles, laterals, etc.).

Suspended Sediment (Fluff): Lightweight particles in suspension.

Sweep Rafts: Large rafts or barges (up to 100 ft long) used to suspend heavy channel sweeping bars for clearing projects at authorized grade.

Sweep Survey: Channel sweep survey.

Take-off: See *Quantity Take-Offs*.

Task Order: Separate work item under an Indefinite Delivery Contract for surveying services. Previously termed Delivery Order or Work Order.

Template: Design, required, or overdepth prisms.

Tertiary Tide Station: A tide station at which continuous observations have been made over a minimum period of 30 days but less than 1 year.

Tidal Datum: A construction/excavation datum based on a tidal phase reference, usually mean lower low water.

Tide: The periodic rise and fall of water resulting from gravitational interactions between the sun, moon, and earth.

Tide Station: The geographic location at which tidal observations are conducted. Also, the facilities used to make tidal observations (tide staff, tide gage, tide house, tidal benchmarks, etc.).

Total Station: An electronic surveying instrument which digitally measures and displays angular, distance, and/or x-y-z coordinate data to a stationary remote point. A fully automated self-tracking total station will automatically track a moving target.

Track Plotter: A digital hard-copy plotter once used on a dredge or survey boat to record the line track of the vessel to monitor dredging or survey alignment, coverage, progress, etc.

Transformation (of coordinates): Conversion of coordinates from one coordinate system (or datum) to another.

Transponder: A remote EPS station which receives and reprocesses a signal from an offshore vessel. (Also, Motorola, Inc., EPS.)

Triangulated Irregular Network (TIN): A linked network of x-y-z data points in a digital terrain model (DTM) from which volumes can be computed using the triangular prismoidal elements.

Triangulation Intersection (Vessel Positioning): Determining the position of an offshore point by measuring two or more angles (directions or azimuths).

Trilateration Positioning: Method of position determination using the intersection of two or more distances to a point.

Trisponder: Trade name for Del Norte, Inc., electronic positioning equipment.

Turning Basin: An open area along the end of a waterway or harbor to allow vessels to turn around or moor. In restricted interior channels, a basin enabling a vessel to reverse direction and leave the harbor or make a substantial change in direction.

Uncontrolled Centerline Survey: A reconnaissance survey of the approximate center-line alignment of a navigation project, usually with minimal (visual) positioning methods.

Uncontrolled Survey: Any hydrographic survey performed with minimal horizontal control.

Underwater Obstruction Surveys: Surveys of navigation hazards for salvage or debris removal.

Unit Price Dredging Construction Contract: Procurement of dredging services in which payment is based on an applicable unit price from a specified section, typically measured in volume (cubic yards), area (per station or per square yard), or time (per hour or fraction thereof).

Universal Transverse Mercator (UTM) Coordinate System: A worldwide metric military coordinate system rarely used for civil works applications.

Upland Disposal Area: A dredging disposal area located adjacent to or upland from the navigation project.

Widener Section: An enlarged section at the intersection of two channels.

World Geodetic System 1984 (WGS 84): A rotational ellipsoid having the following dimensions: semi-major axis, 6,378,137 m; semi-minor axis (derived), 6,356,752 m; flattening (derived), 1/298.257224. This ellipsoid reference model/datum is the surface from which GPS coordinates are computed. The WGS 84 and the GRS 80 use the same earth center, which makes the NAD 83 adjustment coordinates compatible for practical engineering applications using differential GPS measurements to obtain geodetic positions relative to the reference station.

Zero Tolerance: Dredging payment method under which no allowable overdepth allowance is authorized.